US 871926 for this sheet

Br. Pt. 18.360 Aug 16, 1907

French pat. 381.251

German 203.785

Gathmann

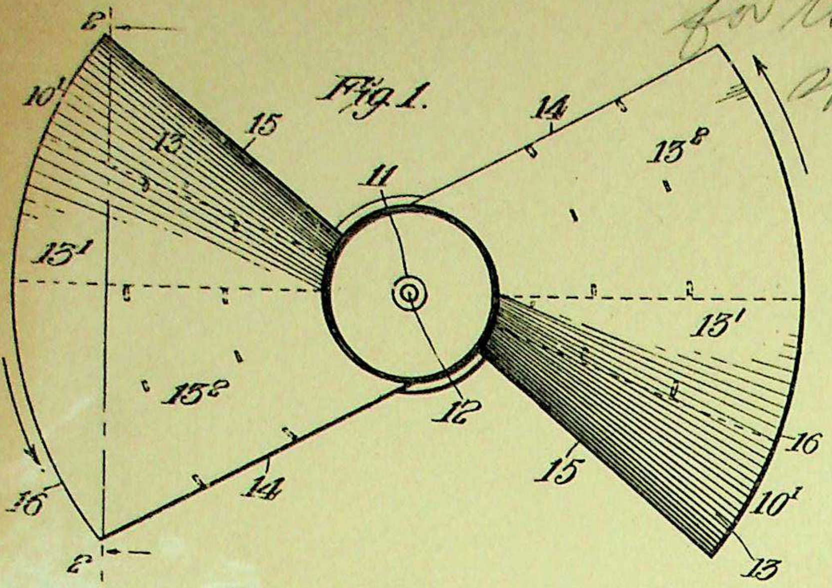

Fig. 1.

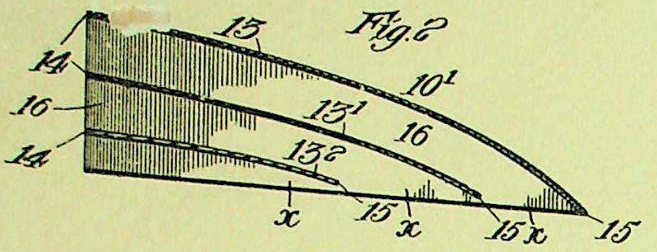

Fig. 2

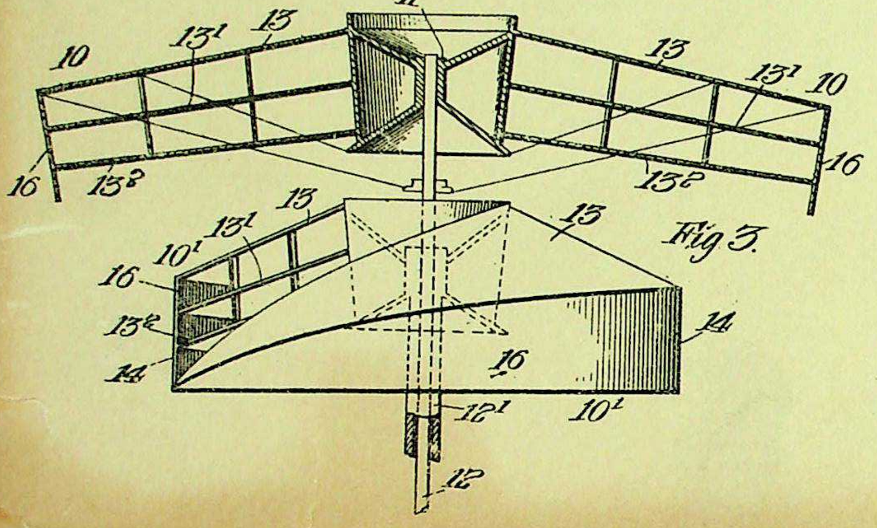

Fig. 3.

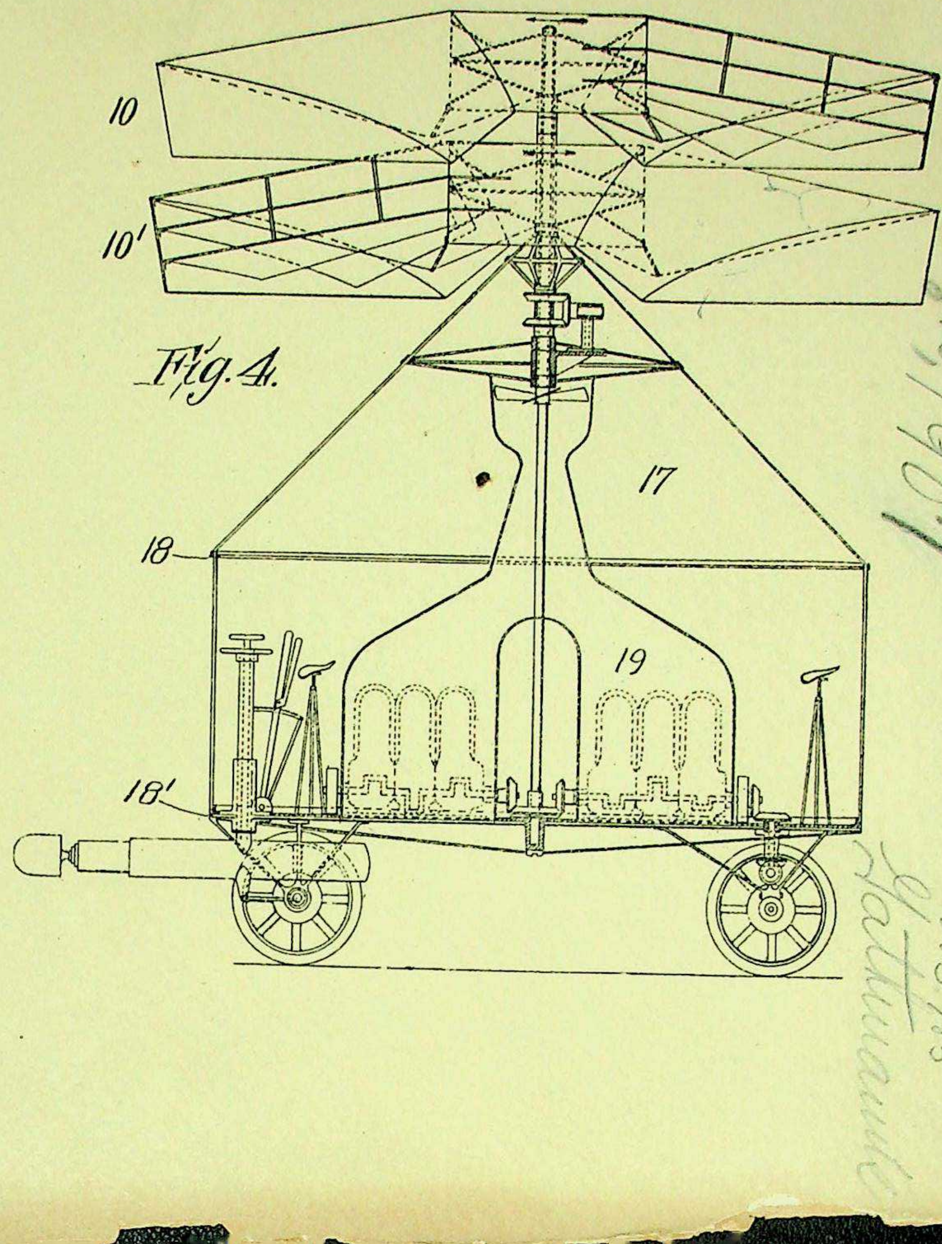

Fig. 4.

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N° 18,560 A.D. 1907

Duplicate.

(*Under International Convention.*)

Date claimed for Patent under Patents and Designs Act, 1907, being date of first Foreign Application (in the United States), 6th Mar., 1907

Date of Application (in the United Kingdom), 16th Aug., 1907

Accepted, 9th Jan., 1908

COMPLETE SPECIFICATION.

Improvements in Air Propellers for Flying Machines.

I, Louis Gathmann, Engineer, of 2017 Kalorama Avenue, Washington, in the District of Columbia, U.S.A., do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

My invention has for its object the production of an air propeller designed to afford a maximum thrusting or lifting efficiency with a minimum application of power. My invention further consists in providing means for using an air propeller in connection with an apparatus adapted for aerial flight.

To this end my invention consists in certain novel features and combination of parts which I will now proceed to briefly describe and particularly point out in the claims.

In the accompanying drawings Figure 1 is a plan or top view of an air propeller having two sets of vanes. Figure 2 in a cross section on line 2—2 of Figure 1. Figure 3 shows two propellers mounted on two shafts 12 and 12^1, the latter being a hollow shaft so that the propellers may be rotated in opposite directions to each other. Figure 4 is a vertical section showing the air propeller applied to a car. Similar letters refer to similar parts throughout the several views. 10 is the propeller towards the centre of which is located the hub 11 which is securely fastened to the vanes and preferably to the propeller shaft 12. 13, 13^1 and 13^2 are the aero-blades or planes, 14 being the forward portion and 15 the rear portion of the same. 16 is the circumferential retaining wall of the vanes. 17 is the car of apparatus adapted for aerial flight. 18 and 18^1 are annular rims which support the main construction of the car. 19 is illustrative of motor for rotating the propeller shaft or shafts.

By rotating the propeller thus constructed at a high rate of speed, pressure is produced below the said superimposed blades or planes 13, 13^1 and 13^2 of the vanes 10. The resulting difference between the pressure upon the upper and lower sides of said aero-planes or blades, gives the propeller a lifting or thrusting force exactly proportional to the degree of difference of this pressure.

The high efficiency of the propeller thus constructed is due to the following essential parts and the combination of the superimposed aero-blades or planes

13, 13^1 and 13^2 and to the circumferential retaining wall 16. The air at atmospheric pressure entering at the forward portion 14 between the aero-blades or planes, owing to the rotation of the vanes in the direction of the arrows, is forced toward the retaining wall 16 by centrifugal force and is therefore considerably compressed before passing downward from the delivery channels *x*—*x* at the rear portion 15 of the aero-blades or planes. As the compressed air is discharged downward from delivery channels *x*—*x* it performs its most important function by the reaction or recoil against the aero-blades forcing the propeller in the opposite direction from the flow of the escaping air in a manner similar to a rocket.

In order to obtain the maximum recoil or reaction it will be seen that the uppermost aero-plane or blade 13 should extend beyond the rear edge of the lower blade or plane. It is also very important to have the rear edge 15 of the higher aero-plane or blade extend lower than the aero-plane or blade situated below, as shown in section in Figure 2, so as not to create a rarefaction or rotary motion of the air in front of the aero-plane above and thus produce excessive slip and yielding lower pressure.

Extensive experiments which have extended over a period of a number of years have convinced me that the key to successful flying machines is a propeller of high efficiency. A propeller consisting of rotary aero-planes on the lines shown and described has, from actual tests made by me, shown a lifting force of about 75 pounds per applied horse power. An aerial locomobile with this type of propeller, built entirely of high grade steel, and having from 12 to 20 feet extreme diameter according to its speed of rotation weighs approximately 900 pounds and would have a carrying capacity of about 2,400 pounds with applied power of 32 horse power. It is obvious that the principle of my invention may be modified in many ways, for instance, small openings in the wall 16 would not effect the result or efficiency materially although a smooth, closed surface is best; also, the propeller may be mounted either horizontally or vertically.

Many modifications may undoubtedly be made without departing from the spirit of my invention.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. A rotary air propeller having two or more sets of vanes each of said vanes consisting of two or more superimposed or adjacent aero-planes, the rear edge of the uppermost aero-plane over-lapping or extending to rearward and downwardly beyond the rear edge of the underneath plane, substantially as set forth and for the purpose described.

2. In a rotary propeller as above claimed the combination therewith of a segment circumferential wall for closing the passage between said aero-planes.

3. In a rotary propeller as above claimed the fixing of the aero-planes so that they incline at a downward angle from the horizontal towards their rear portion and towards the circumference.

Dated this 16th day of August, 1907.

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